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S/N 09/202,634

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	SCHUBERT ET AL.	Examiner:	J. EINSMANN
Serial No.:	09/202,634	Group Art Unit:	1634
Filed:	MARCH 3, 1999	Docket No.:	9725.13USWO
Title:	OZONE-INDUCED GENE EXPRESSION IN PLANTS		

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited in the United States Postal Service, as first class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on July 5, 2002.

By:

Name:

AMENDMENT AND RESPONSE

Commissioner for Patents  
Washington, D.C. 20231



Dear Sir:

Responsive to the Office Action mailed March 4, 2002, Applicants submit the following amendments and remarks. This Amendment and Response is being filed concurrently with a one-month extension with appropriate fees. Reconsideration of the merits of the application in light of the following amendment and remarks is respectfully requested.

IN THE SPECIFICATION

Please delete pages 32 and 33.

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Please amend the paragraph corresponding to the table at page 34 to read as follows:

VstI promotor 5'-deleted to position	Examined, independent, transgenic, tobacco lines	GUS-enzyme activity		induction factor
		[pmol MU min <sup>-1</sup> + ozone	mg <sup>-1</sup> protein] - ozone	
-1500	1F(1)	735 ± 100	63 ± 7	11.7
-740	2(F1)	388 ± 59	30 ± 5	12.9
-550	3(F0)	126 ± 13	12 ± 3	10.5
	2(F1)	173 ± 25	15 ± 3	11.5
-500	5(F0)	148 ± 52	15 ± 6	9.9
-430	6(F0)	141 ± 38	14 ± 4	10.0
	6(F0)	22 ± 4	13 ± 3	1.7
-280	2(F1)	30 ± 3	15 ± 3	2.0
	2(F0)	12 ± 0.2	8 ± 3	1.5
-140	3(F1)	24 ± 3	15 ± 3	1.6
	3(F1)	24 ± 2	15 ± 3	1.6
-40	3(F1)	24 ± 2	15 ± 3	1.6
+70	1(F1)	3.5 ± 1	3.5 ± 1	1.0

#### IN THE CLAIMS

Please cancel claims ~~5-7, 12-14, 16, 17, 22, 24-26, 29-32, and 34-37~~ without prejudice.

Please amend claims 1-4, 8-11, 15, 18-21, 23, 27, 28, and 33 and add new claims 38-43  
as follows

1. (Amended) An isolated nucleic acid comprising of the sequence:

ACTTTTCGAG CCCCTTGAAC TGGAAATTAA TACATTTTCC ACTTGACTT  
TGAAAAGGAG GCAATCCCAC GGGAGGGAAG CTGCTACCAA CCTTCGTAAT  
GTTAATGAAA TCAAAGTCAC TCAATGTCCG AATTTCAAAC CTCANCAAC  
CAATAGCCAA T (SEQ ID NO: 1),

as set forth in Claim 4.

2. (Amended) The isolated nucleic acid of Claim 4, which originates from grapevine (*Vitis vinifera*).

3. (Amended) The isolated nucleic acid of Claim 4 which is naturally contained in the stilbene-synthase gene Vst1 at base pairs -270 to -430.

C<sub>2</sub> 4. (Amended) An isolated nucleic acid

having a sequence identity of at least 40% to a nucleic acid having sequence:

ACTTTTCGAG CCCCTTGAAC TGGAAATTAA TACATTTTCC ACTTGACTT  
TGAAAAGGAG GCAATCCCAC GGGAGGGAAG CTGCTACCAA CCTTCGTAAT  
GTTAATGAAA TCAAAGTCAC TCAATGTCCG AATTTCAAAC CTCANCAAC  
CAATAGCCAA T (SEQ ID NO: 1),

and which conveys an ozone-inducible gene expression, or  
which is a derivative, or

an allelic variant of the isolated nucleic acid sequence:

ACTTTTCGAG CCCCTTGAAC TGGAAATTAA TACATTTTCC ACTTGACTT  
TGAAAAGGAG GCAATCCCAC GGGAGGGAAG CTGCTACCAA CCTTCGTAAT  
GTTAATGAAA TCAAAGTCAC TCAATGTCCG AATTTCAAAC CTCANCAAC  
CAATAGCCAA T (SEQ ID NO: 1),

which differs from said sequence by naturally occurring or artificially introduced variations and  
which conveys ozone-inducible gene expression.

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8. (Amended) A chimeric nucleic acid molecule comprising the sequence as set forth in Claim 4  
or an ozone-inducible fragment thereof.

C<sub>3</sub> 9. (Amended) ~~The chimeric nucleic acid molecule of Claim 8 further comprising coding regions, wherein the chimeric molecule renders ozone-inducible expression of the coding regions in plants.~~

10. (Amended) A vector comprising the nucleic acid sequence as set forth in Claim 4, or  
fragments thereof.

C3 11. (Amended) A transgenic plant or constituent or propagation material thereof comprising the nucleic acid sequence as set forth in Claim 4.

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C4 15. (Amended) A plant as set forth in Claim 11, wherein said nucleic acid sequence does not naturally occur, and wherein ozone-inducible gene expression is conveyed.

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18. (Amended) A plant as set forth in Claim 15, in which an ozone-inducible expression of reporter genes occurs.

C5 19. (Amended) A plant as set forth in Claim 11, wherein the plant is a dicotyle plant.

20. (Amended) A plant as set forth in Claim 11, wherein the plant is a monocotyle plant.

21. (Amended) A transgenic plant cell comprising the nucleic acid sequence, as set forth in Claim 4.

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C6 23. (Amended) A plant cell as set forth in Claim 21, wherein said nucleic acid sequence does not naturally occur, and wherein ozone-inducible gene expression can take place

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Sub 27  
C7 27. (Amended) A method for the production of transgenic plants or plant cells comprising:  
introducing into said plant or plant cell a nucleic acid molecule comprising the sequence as set forth in claim 4, or a fragment thereof,  
wherein one or several genes, the expression of which is not naturally occurring or not substantially induced by ozone, are ozone inducible, due to the introduction of the nucleic acid molecule.

28. (Amended) A method as set forth in Claim 27, wherein the one or several genes are catalase and/or superoxide-dismutase genes.

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33. (Amended) A method for producing ozone-inducible characteristics in transgenic plants or plant cells comprising:

C<sub>8</sub> inserting a nucleic acid molecule comprising the sequence, as set forth in Claim 4, or at least a fragment thereof, into genes which are not naturally or not substantially inducible through ozone.

C<sub>9</sub> 38. (NEW) The isolated nucleic acid sequence of Claim 4, wherein the naturally occurring or artificially introduced variations are deletions, insertions, substitutions, additions, recombinations, or a combination thereof.

39. (NEW) The transgenic plant or constituent or propagation material of Claim 11, wherein the transgenic plant constituent or propagation material is a protoplast, a plant cell, a callus, a seed, a tuber, a cutting, or an offspring.

40. (NEW) A dicotyle plant as set forth in Claim 19, wherein the plant is soya bean, rape, tomato, sugar beet, potato, cotton, tobacco, or ornamental plant or tree.

41. (NEW) A monocotyle plant as set forth in Claim 20, wherein the plant is grain.

42. (NEW) A plant as set forth in claim 41,

43. (New) A method as set forth in claim 27, wherein the transgenic plants are biomonitors for the quantitative and/or qualitative determination of ozone-concentrations.

### REMARKS

Claims 5-7, 12-14, 16, 17, 22, 24-26, 28, 30-32, 34, and 37 have been cancelled. Claims 1-4, 8-11, 15, 18-21, 23, 27, 28, and 33 have been amend. New claims 38-43 have been added. Upon entry of the above amendment, claims 1-4, 8-11, 15, 18-21, 23, 27, 28, 33, and 38-43 will be pending in this case.

No new matter has been introduced. The amended claims have been amended to conform with typical US practice, while the new claims include subject matter provided in the claims as originally filed.

### Election Restriction

Applicants acknowledge that the Examiner has applied the unity of invention standard in maintaining the restriction requirement. Applicants affirm election of group I, claims 1-4, 8-11, 15-21, 23, 27-29, 33, 35, and 36. Claims 5-7, 12-14, 22, 24-26, 30-32, 34, and 37 have been cancelled.

### Specification/Sequence Listing

The Examiner objected to the specification for failing to comply with the requirements of 37 CFR 1.821-1.825. Specifically, the Examiner states that the claims recite a nucleic acid sequence without a proper sequence identifier. Claim 1 has been amended to recite the appropriate sequence identifier. A new computer readable form and paper copy of the sequence listing will be submitted shortly as requested by the Examiner.

In addition, the Examiner objected to the appearance of Table 1 twice in the specification and the typographical error associated with the induction factor of VstI promoter deleted to -280 for the F1 generation is wrong. One copy of the table at pages 32-33 has been deleted and the remaining table has been amended to correctly recite "2.0" rather than "20".

In light of the amendments to the specification, withdrawal of the objection is respectfully requested.

### Rejection under 35 USC 101

Claims 1-4 have been rejected under 35 USC 101 as being directed to non-statutory subject matter because the claims did not indicate that the DNA sequences are isolated or purified from their natural form. Applicants respectfully traverse the rejection to the extent it is maintained.

Claims 1-4 have been amended to recite "isolated nucleic acid sequence". Withdrawal of the rejection is respectfully requested.

Claims 35 and 36 have been rejected under 35 USC 101 for reciting a use without reciting forth any steps in the process. Applicants traverse the rejection to the extent it is maintained.

Claims 35 and 36 have been cancelled. Withdrawal of the rejection is respectfully requested.

### Claim Objections

Claims 4, 8-9, 10, 27-29, 33, 35, and 36 were objected to as failing to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 4 has been amended to be independent. Claims 8, 9, 10, 27-29, and 33 have been amended to depend from claim 4. Claims 35 and 36 have been cancelled. Applicants assert that the claims are in proper dependent form. Withdrawal of the rejection is respectfully requested.

### Rejections under 35 USC 112, second paragraph

Claims 1-4, 8-11, 15-21, 23, 27-29, 33, 35, and 36 have been rejected under 35 USC 112, second paragraph as allegedly being indefinite. Applicants traverse the rejection to the extent it is maintained.

The Examiner stated that the claims are generally narrative and fail to conform to US practice. The claims have been amended to conform to better conform to US practice.

The specific rejections of the Examiner have also been addressed in the amendment above.

In addition, the Examiner stated that claims 11, and 15-20 were indefinite because it is not clear what is meant by "constituents" of a plant. Applicants assert that the term "constituents" is clear and definite in the context used. One would understand that "constituents" of a plant corresponds to that which constitutes a plant.

Withdrawal of the rejection is requested.

Rejections under 35 USC 112, first paragraph

Claims 8 and 9 have been rejected under 35 USC 112, first paragraph as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey that the inventors had possession of the invention at the time of the filing of the application. Applicants traverse the rejection to the extent it is maintained.

The Examiner stated that the language "with the exception of the nucleic acid molecules that comprise the Vst1 promoter region occurring naturally in the Vst1-promoter 3' of the sequence, set forth in claim 1, as well as said sequence" appears to represent new matter. Applicants assert that the specification provides support for the objected to language (e.g., page 8, paragraph 3). Nonetheless, to expedite allowance of these claims, claim 8 has been amended to delete the objected to language. Claim 9, which depends on claim 8, thus also no longer refers to the objected to language. Withdrawal of the rejection is respectfully requested.

Claims 16, 17, and 28 have also been rejected under 35 USC 112, first paragraph. Applicants traverse the rejection to the extent it is maintained. Claims 16, 17, and 28 have been cancelled, rendering the rejection moot. Withdrawal of the rejection is respectfully requested.

Claims 4, 10, 27, 33, 35, and 36 have also been rejected under 35 USC 112, first paragraph as allegedly containing subject matter not described in the specification. Applicants traverse the rejection.

The Examiner stated that applicant has not provided any example of fragments shorter than instant SEQ ID NO: 1 that retains function as an ozone-inducible promoter. However, the specification does disclose that active derivatives are contemplated. See, e.g., the last paragraph of page 12, the paragraph bridging page pages 13 and 14, and the second paragraph and third paragraphs of page 16 provide support for claim 4. Specifically, the third paragraph of page 16 discloses that the DNA sequences according to claim 4 constitute active derivatives.



Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 102

Claims 1-4, 11, 15, 18, 19, 21, 23, 27, 29, 33, 35, and 36 were rejected under 35 USC 102(b) as allegedly being anticipated by Fisher (1994, Dissertation, "Optimierung der heterologen Expression von Stiobensynthasegenen für den Pflanzenschutz" Institut für Biotechnologie, Universität Hohenheim). Applicants traverse the rejection.

The Examiner stated that Fisher teaches a promoter comprising the instant SEQ ID NO: 1 as recited in instant claim 1, vectors containing SEQ ID NO: 1, and transgenic plants containing the vectors including SEQ ID NO: 1. The Examiner further stated that the ozone-inducible gene expression is an inherent property of transformed plants taught by Fisher. Applicants respectfully disagree with the Examiner.

According to the International Preliminary Examination Report (IPER) of the PCT application on which the application is based, the claimed DNA fragment is new and inventive in light of the Fisher dissertation. Specifically, the IPER states:

"[Fisher] describes shortened forms of the Vst-1 promoter (Page 90, Table 11) which are fused with the GUS gene. However, these forms do not consist specifically of the selected -430 to -270 range but always contain the region downstream from -280 to the beginning of the promoter sequence of the stilbene synthase gene. It can also not be concluded from [Fisher] that the range between -430 and -270 could be responsible for the regulation of ozone. Thus, also homologous fragments derived therefrom with the same function are allowable (Claim No. 4). The same applies to Claim 15-18 and Claim 23, Procedural Claims 24-33, as well as Useability Claims 34-36, which depend therefrom."

The instant US Examiner has not indicated at which locations the Fisher dissertation discloses sequences or vectors comprising SEQ ID NO: 1 or transgenic plants comprising vectors including SEQ ID NO: 1. Applicants respectfully request the Examiner to indicate the location of the disclosure of the Fisher dissertation that anticipates the claims of the instant application, or alternatively that the Examiner withdraw the rejection.

Rejection under 35 USC 103

Claim 20 has been rejected under 35 USC 103(a) as allegedly being obvious over Fisher in view of Logemann et al (US Patent No. 5,689,045). Applicants respectfully traverse the rejection.

As stated above, the Examiner has failed to show where Fisher disclose a promoter comprising the instant SEQ ID NO: 1 as recited in instant claim 1, vectors containing SEQ ID NO: 1, and transgenic plants containing the vectors including SEQ ID NO: 1. Assuming the European Examiner who issued the IPER is correct regarding the deficiencies of Fisher with regard to the instantly claimed subject matter, Logemann et al does not overcome the deficiencies of Fisher. Logemann does not teach or suggest a sequence such as SEQ ID NO: 1 or any promoter sequence providing regulation of ozone resistance. Accordingly, the claimed invention is unobvious over the cited references. Withdrawal of the rejection is respectfully requested.

CONCLUSION


Applicants submit that the present Amendment places the application in condition for allowance; prompt passage to issue is earnestly solicited.

Respectfully submitted,

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Date: \_\_\_\_\_

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